FIG. 1

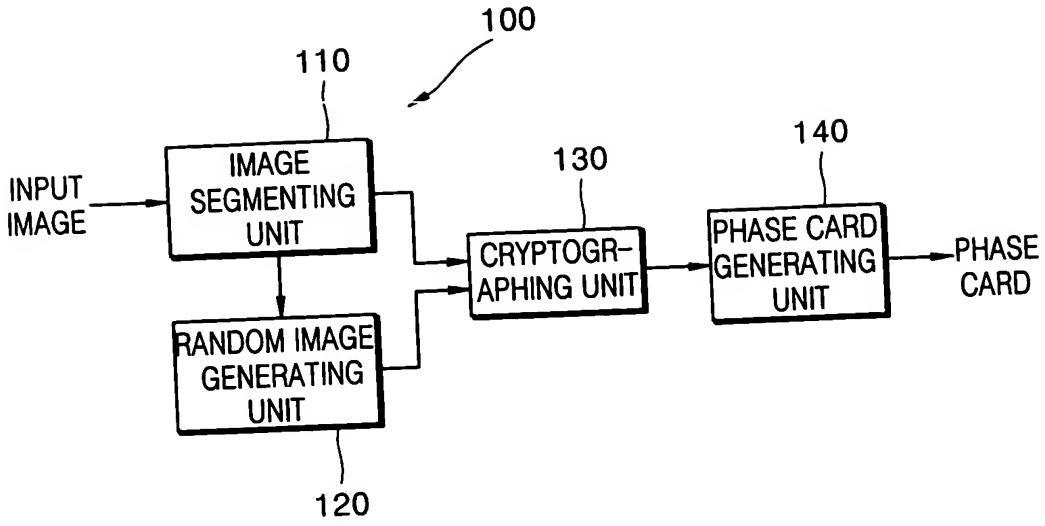

100
110
INPUT IMAGE
IMAGE SEGMENTING UNIT
130
CRYPTOGR-APHING UNIT
140
PHASE CARD GENERATING UNIT
PHASE CARD
RANDOM IMAGE GENERATING UNIT
120

FIG. 2

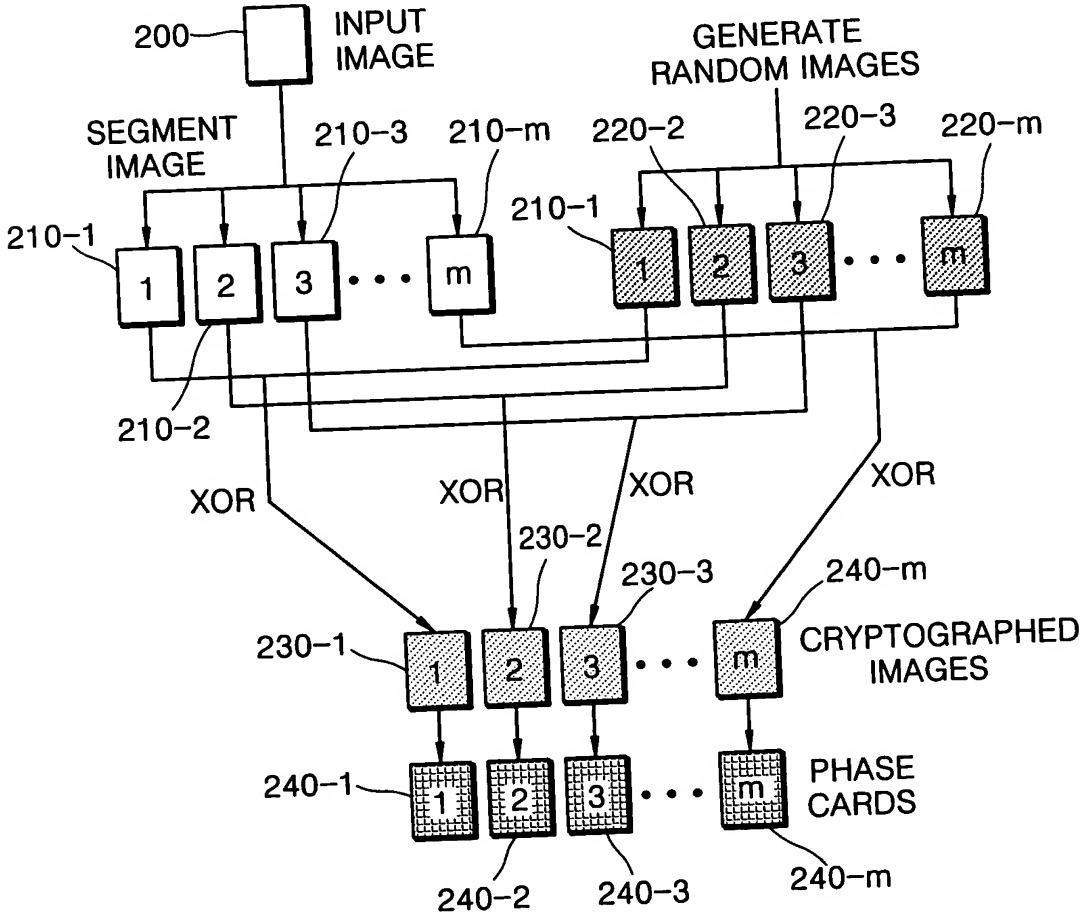

200
INPUT IMAGE
GENERATE RANDOM IMAGES
SEGMENT IMAGE
210-1
210-2
210-3
210-m
220-2
220-3
220-m
1
2
3
m
XOR
230-1
230-2
230-3
240-m
CRYPTOGRAPHED IMAGES
240-1
240-2
240-3
PHASE CARDS

FIG. 3

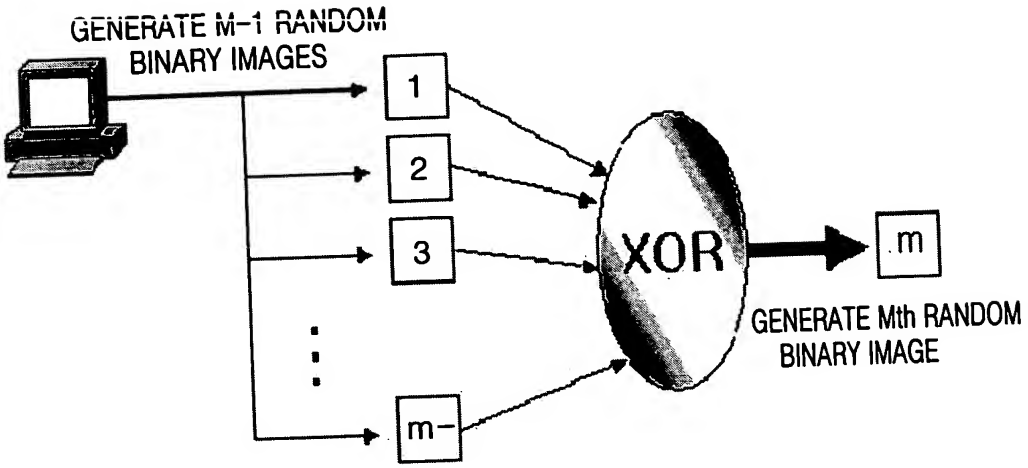
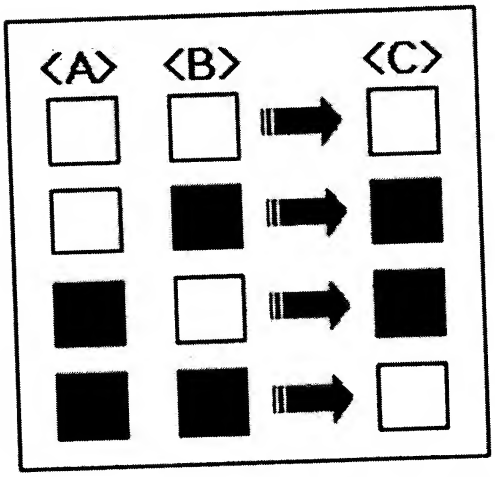


FIG. 4



<A> PIXELS OF SEGMENTED IMAGES
<B> PIXELS OF RANDOM IMAGES
<C> RESULTS OF XOR OPERATIONS
PERFORMED ON <A> AND <B>

FIG. 5

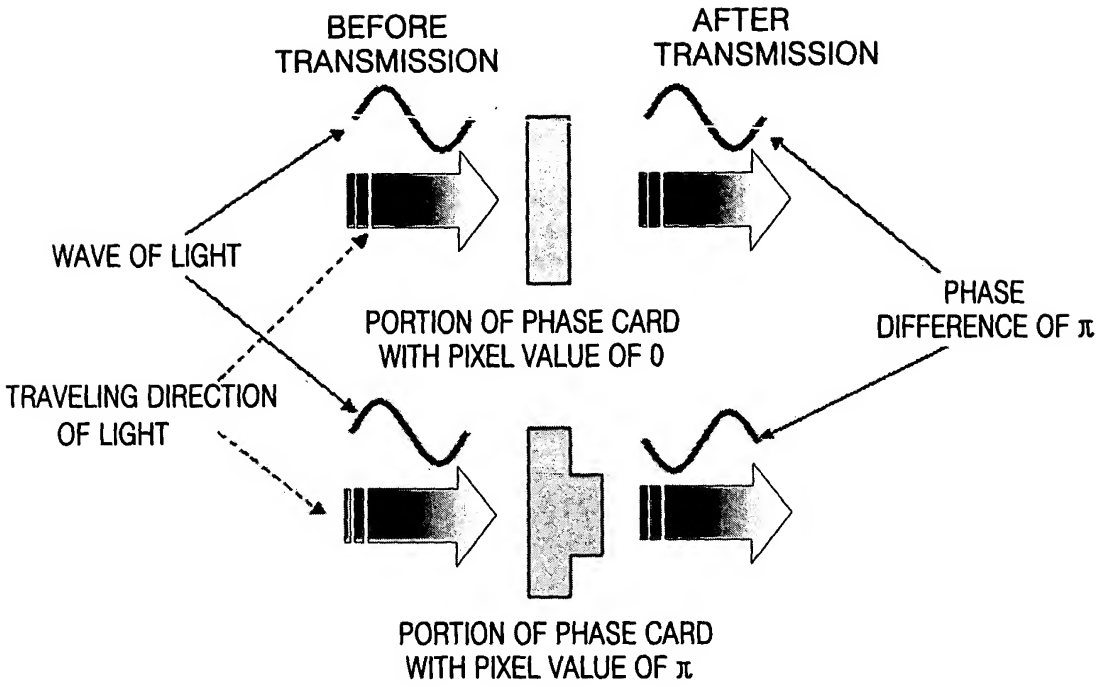

BEFORE TRANSMISSION
AFTER TRANSMISSION
WAVE OF LIGHT
PORTION OF PHASE CARD WITH PIXEL VALUE OF 0
PHASE DIFFERENCE OF π
TRAVELING DIRECTION OF LIGHT
PORTION OF PHASE CARD WITH PIXEL VALUE OF π

FIG. 6

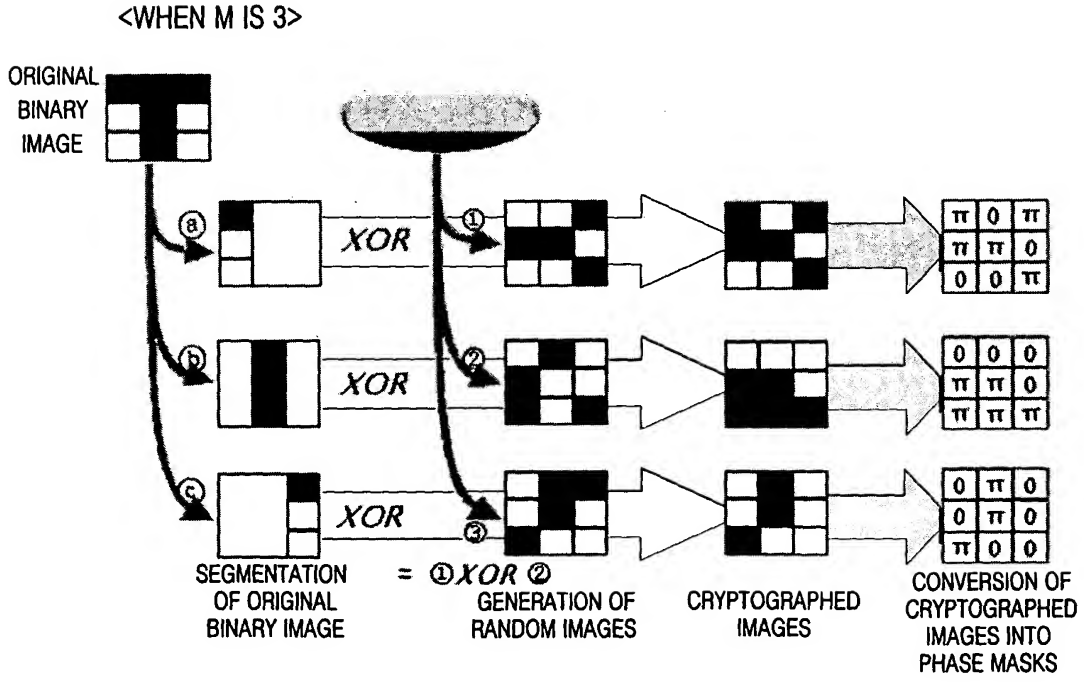

<WHEN M IS 3>
ORIGINAL BINARY IMAGE
XOR
XOR
XOR
SEGMENTATION OF ORIGINAL BINARY IMAGE
= ①XOR ②
GENERATION OF RANDOM IMAGES
CRYPTOGRAPHED IMAGES
CONVERSION OF CRYPTOGRAPHED IMAGES INTO PHASE MASKS

FIG. 7

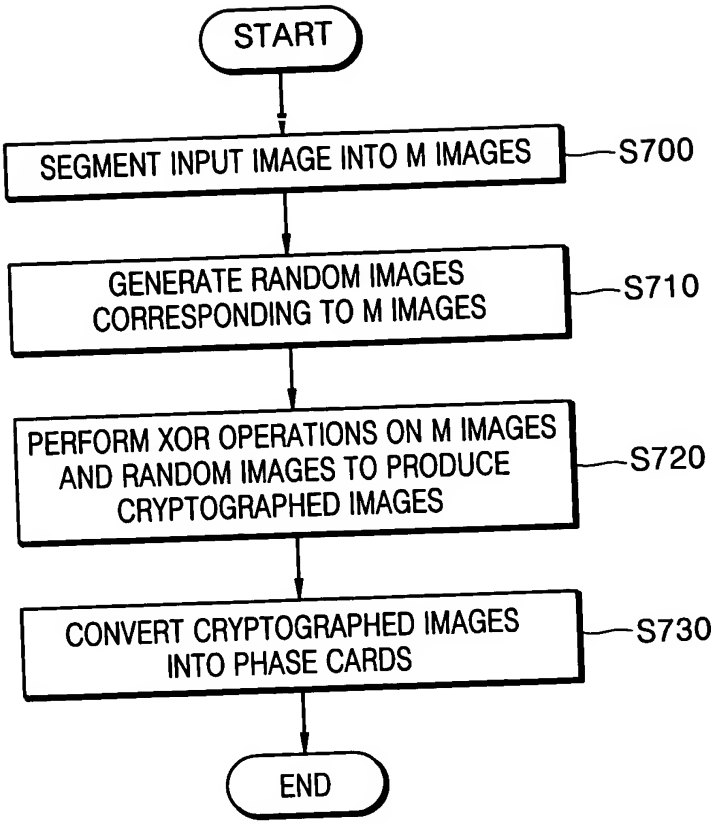

START
SEGMENT INPUT IMAGE INTO M IMAGES
S700
GENERATE RANDOM IMAGES CORRESPONDING TO M IMAGES
S710
PERFORM XOR OPERATIONS ON M IMAGES AND RANDOM IMAGES TO PRODUCE CRYPTOGRAPHED IMAGES
S720
CONVERT CRYPTOGRAPHED IMAGES INTO PHASE CARDS
S730
END

FIG. 8

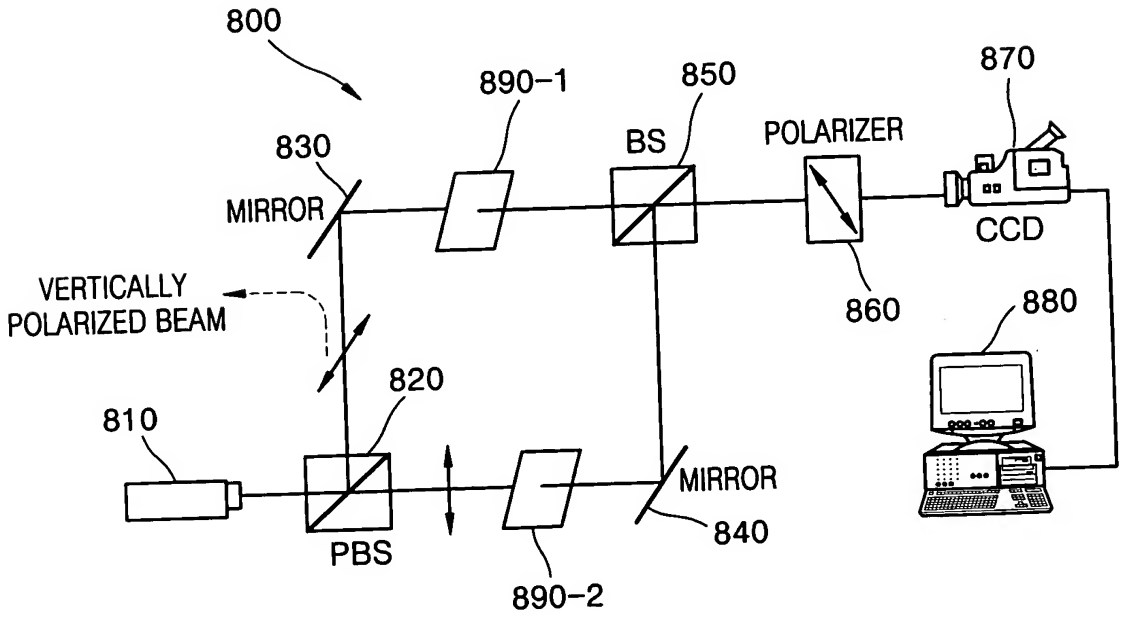

800
890-1
850
870
830
BS
POLARIZER
MIRROR
CCD
VERTICALLY POLARIZED BEAM
860
880
820
810
MIRROR
PBS
840
890-2

FIG. 9A

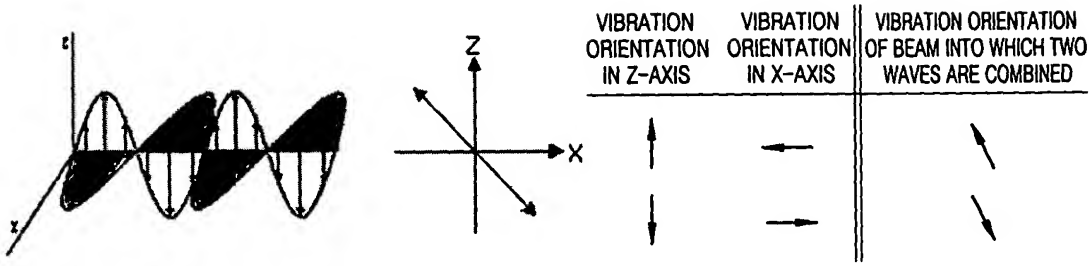

Z
X
VIBRATION ORIENTATION IN Z-AXIS
VIBRATION ORIENTATION IN X-AXIS
VIBRATION ORIENTATION OF BEAM INTO WHICH TWO WAVES ARE COMBINED

FIG. 9B

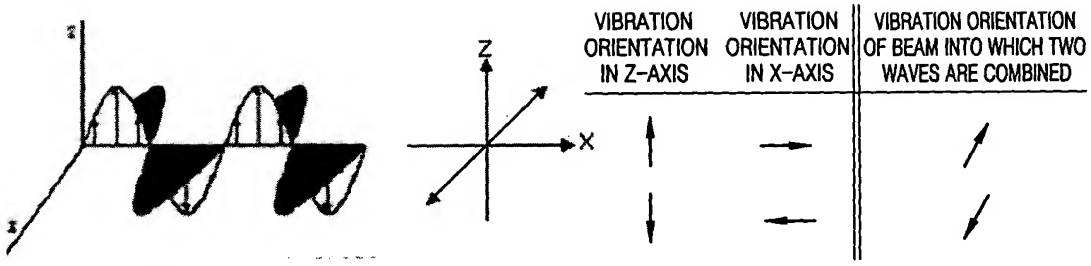

Z
X
VIBRATION ORIENTATION IN Z-AXIS
VIBRATION ORIENTATION IN X-AXIS
VIBRATION ORIENTATION OF BEAM INTO WHICH TWO WAVES ARE COMBINED

FIG. 10

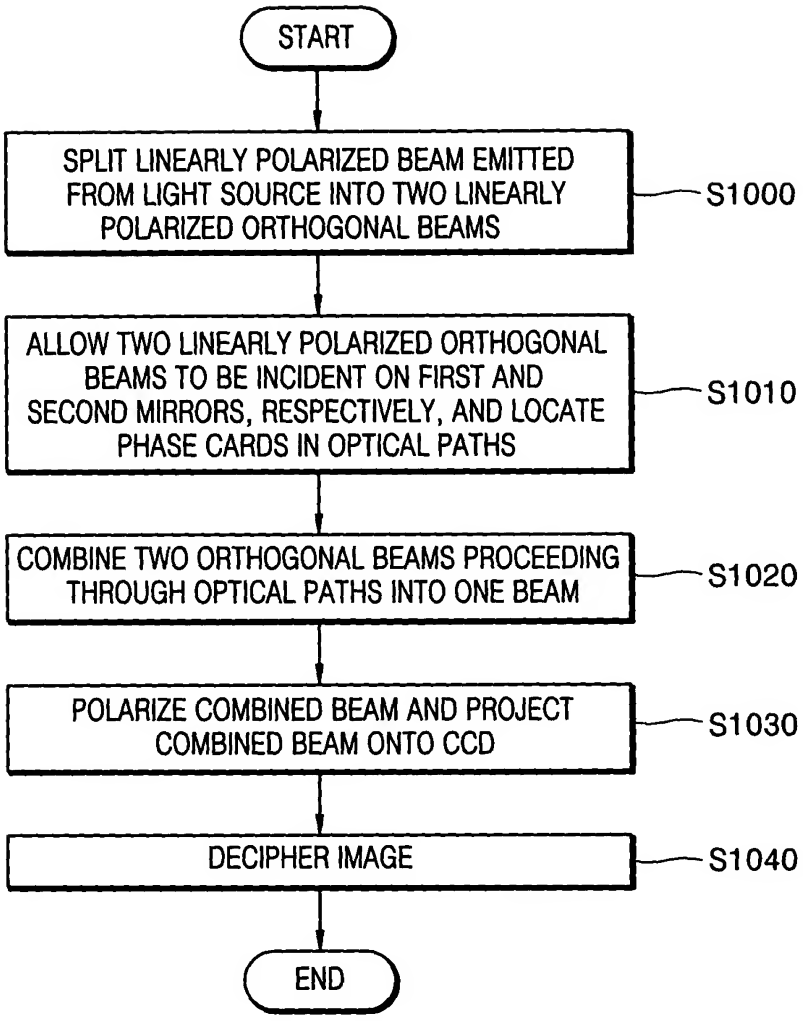

START
SPLIT LINEARLY POLARIZED BEAM EMITTED FROM LIGHT SOURCE INTO TWO LINEARLY POLARIZED ORTHOGONAL BEAMS
S1000
ALLOW TWO LINEARLY POLARIZED ORTHOGONAL BEAMS TO BE INCIDENT ON FIRST AND SECOND MIRRORS, RESPECTIVELY, AND LOCATE PHASE CARDS IN OPTICAL PATHS
S1010
COMBINE TWO ORTHOGONAL BEAMS PROCEEDING THROUGH OPTICAL PATHS INTO ONE BEAM
S1020
POLARIZE COMBINED BEAM AND PROJECT COMBINED BEAM ONTO CCD
S1030
DECIPHER IMAGE
S1040
END

FIG. 11A

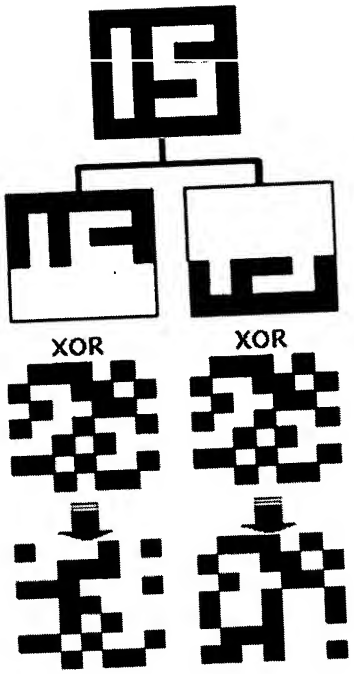


FIG. 11B

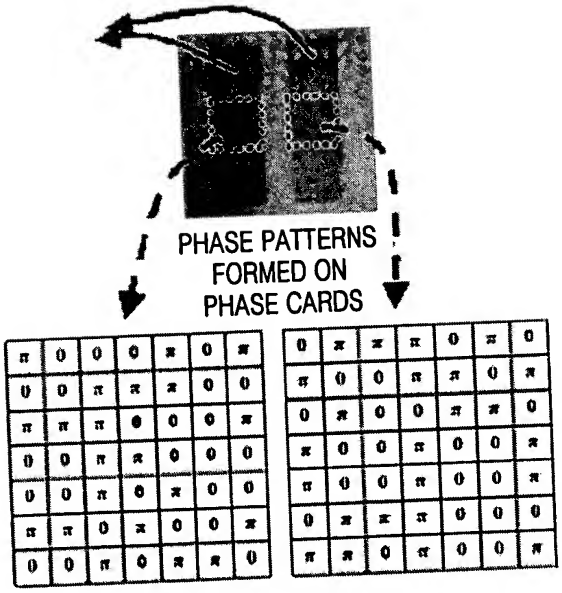
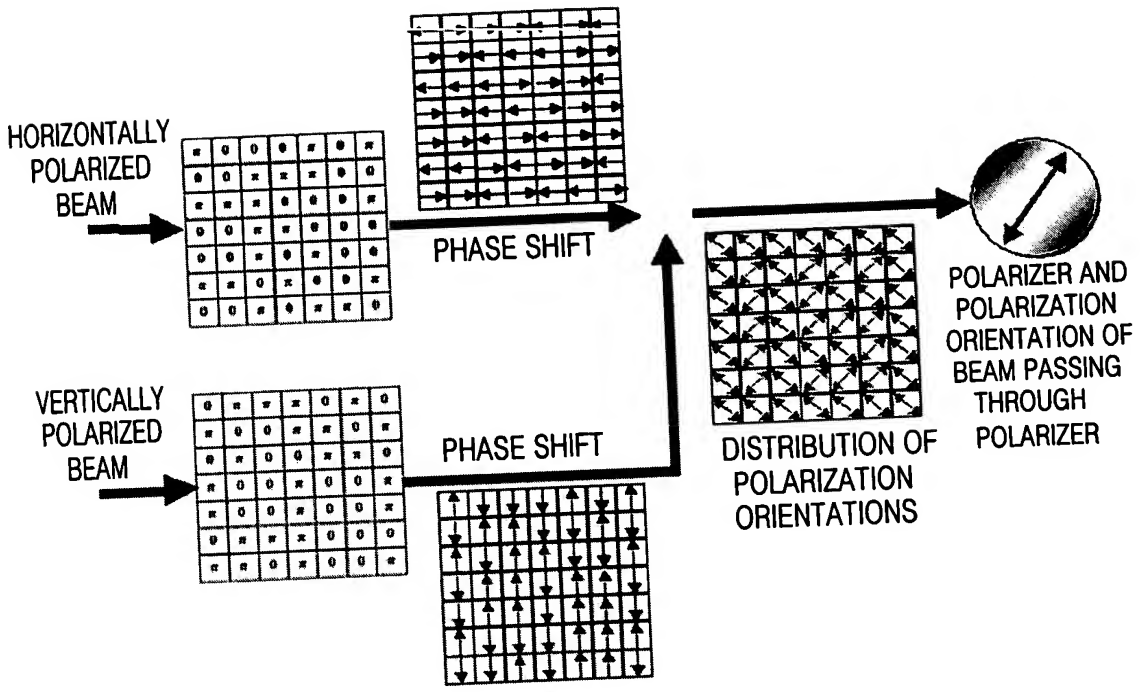


FIG. 12


HORIZONTALLY POLARIZED BEAM
PHASE SHIFT
VERTICALLY POLARIZED BEAM
PHASE SHIFT
DISTRIBUTION OF POLARIZATION ORIENTATIONS
POLARIZER AND POLARIZATION ORIENTATION OF BEAM PASSING THROUGH POLARIZER

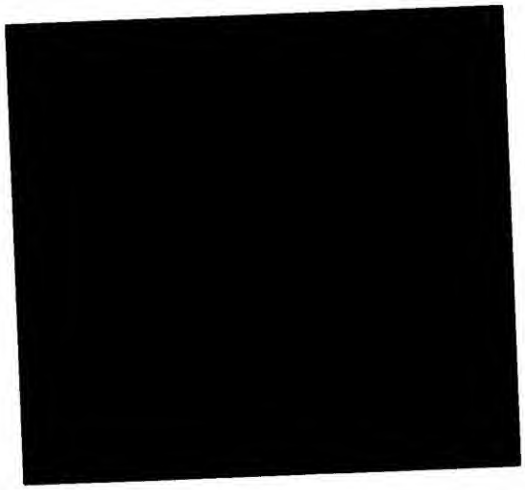



FIG. 13